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ABSTRACT

Building utilization calculations provide an effective management tool for scheduling rooms, teachers, and class groups. Additionally, utilization data help justify need for modernization or replacement of outmoded facilities. A method is presented to help principals provide such figures in a usable and understanding fashion. (Author/MLF)

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CALCULATING SCHOOL
BUILDING UTILIZATION

by

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It is incumbent upon school principals to maintain utilization figures for their buildings. However, some have difficulty providing such figures in an usable and understandable fashion.

Following is how one consultant has helped principals make utilization calculations and present the results in a way which provides the principal with an effective management tool for scheduling rooms, teachers and class groups. Additionally, some principals and superintendents use utilization data to help justify need for modernization or replacement of outmodeled facilities.

UTILIZATION DEFINED

There are two kinds of utilization. One is teacher station utilization (which refers to use of the classrooms) and the other is pupil station utilization (which refers to use of the seats within a classroom). These are vastly different figures and are usable only when examined and discussed in relation to each other.

Teacher Station (Room) Utilization. This figure shows the number of periods per day a room is in use during a given span of time--usually one semester. The calculation needs to be made each semester if the school schedule changes materially at mid-year. If the curriculum includes mini-

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courses, the room utilization is usually unaffected unless the mini-course series does not last a total semester.

If the classroom houses students each period of the day for a total semester the room is utilized 100 percent of the school day. However, if the room is used only 5 periods of a 6-period day, its utilization is $5/6$ or 83.3 percent. If this use is the same each week for the whole semester, then the semester utilization of the room remains at 83.3 percent. For a typical high school a room utilization of 83.3 percent (5 periods of 6) is quite good because it is not possible to schedule each room in a building 100 percent of the time.

Student Station Utilization. This is a more difficult figure to calculate and has potential for misleading the reviewer especially in buildings where the majority of the classrooms are of the same or similar size. The problem here is that a large room housing a small class is not well utilized and a small room housing a large class is crowded.

Some school executives overlook this and calculate pupil station utilization by merely dividing the number of seats or work stations in a room or laboratory into the number of students in the class. For example, if a room contains 25 desks and 22 students are in the class then pupil station utilization is $22/25$ or 88 percent. However, this is an oversimplification because the room may be small and have a capacity for only 20 desks. In this case the utilization would be $22/20$ or 110 percent which indicates the room is 10 percent crowded. Or if the room is large and has a capacity of 30 students and a class of 22, the utilization would be lower-- $22/30$ or 73.3 percent. Pupil station utilization is a function of class size in relation to room capacity, not merely in relation to the number of desks or work stations in the room. This being the case, it is

necessary to know the student capacity of each room and laboratory in the school before the student station utilization can be calculated.

GUIDELINES FOR ROOM CAPACITY

Capacity figures for instructional rooms in secondary school buildings vary somewhat from state to state. In fact, some large school districts have their own room capacity standards. Nonetheless, all are similar and the table below reflects accepted space guidelines for secondary school instructional spaces.

TABLE 1. SPACE STANDARDS FOR CALCULATING CAPACITY OF SECONDARY SCHOOL CLASSROOMS AND LABORATORIES.

Classroom or Laboratory	Recommended Minimum Room Size (Sq. Ft.)	Recommended Area (Sq. Ft.) Per Pupil	Recommend. Max. Class Size
Regular classrooms (English, Math Social Studies, Language, etc.)	800	30	27
Seminar-Resource Rooms	350	25	14
Music			
Instrumental	1,200	20	50
Vocal	1,000	16	60
Art	1,200	50	20
Business Education			
General	800	30	27
Typing	1,200	35	34
Office Practice	1,200	40	25
Science			
General	1,200	40	30
Chemistry	1,200	40	25
Physics	1,200	40	25
Biology	1,200	40	25

Home Economics			
Food	1,200	50	20
Textiles	1,200	50	20
Industrial Arts			
Specialized Shops	1,500	50	20
General Shops	1,800	75	24
Drafting	1,000	40	25
Physical Education	Minimum 4,200 sq. ft. playing floor, plus circulation and seating space* Minimum activity area -- 1,200 sq. ft.**		
Gymnasium			
Auxiliary Gym			
Instructional Media	25 sq. ft. x 10% of enrollment or 1,200 sq. ft. minimum + auxiliary space		
Center (Library)			
Cafeteria (dining)	10-12 sq. ft. per pupil up to 300-400 pupils		

*For P.E. classes most gymnasiums are adequate for large class groups--up to 60 students.

**Auxiliary gymnasiums are used for a wide variety of activities and class sizes.

The caution to be respected from Table 1 is that recommended maximum class size is not a function of the recommended minimum room size divided by the recommended area per pupil. If it were class sizes could be inordinately high. Room size is a function of materials, supplies, and equipment which must be housed, and the instructional activities which must be facilitated. The areas per student as shown in the table above are guideline figures as are the recommended class size figures. Both may vary somewhat from state to state and even among localities within a state.

THE UTILIZATION CHART

Table 2 below shows a complete building utilization chart including the rooms, their use, size, capacity and both teacher and student station utilization.

To facilitate study and understanding of the table, the columns have

TABLE 2. TEACHER STATION AND PUPIL STATION UTILIZATION FOR SEMESTER I AT CENTRAL HIGH SCHOOL--1976-77 School Year.
(Showing only six typical classrooms for illustration purposes)

Col. 1	Col. 2	Col. 3	Col. 4	Column 5						Col. 6	Col. 7	Col. 8	Col. 9		Col. 10	Col. 11	
Room Number	Room Use	Area Sq. Ft.	Capacity	Utilization						Poss. Daily Room Util.	Actual Daily Room Util.	Percent Daily Room Util.	Poss. Daily Seat Util.		Actual Daily Seat Util.	%Daily Seat Util.	
				1	2	3	4	5	6				At 83.3% Room Use (5 periods)	At 100% Room Use (6 periods)		At 83.3% Rm. Use	At 100% Rm. Use
10	English	750	25	27	20	30	23	20	25	6	6	100	125	150	145	116	99
12	Drafting	700	20	15	20	--	22	25	--	6	4	67	100	120	82	82	68
14	Soc.Stud.	750	25	--	30	30	25	20	27	6	5	83	125	150	132	106	88
16	Lang.	800	27	--	20	22	--	--	12	6	3	50	135	162	54	40	33
18	Science	900	22	20	19	24	--	26	25	6	5	83	110	132	114	104	86

Each Room in the School is Listed and Calculations are Entered in This Table.

More

been numbered. Each column heading and the procedure for obtaining the data for each column is discussed below. Interpretation of the figures will be discussed later.

Column 1; Room Number. It is necessary to number each classroom and laboratory in the building. Principals of some small schools identify classrooms by the name of the teacher occupying the room the majority of the time.

Column 2; Room Use. The subject area housed in the room the majority of the time should be entered in this column.

Column 3; Area (Square Feet). The total net area of the classroom should be entered for each room. This is calculated by multiplying the length of the room times the width of the room at floor level. Major projections such as deeply recessed doorways should be subtracted.

Column 4; Capacity. The capacity of the room is calculated by dividing the net area of the room by the recommended area (square feet) per pupil as shown in Table 1.

Column 5; Period Utilization. The size of each class for each period the room is occupied is to be entered for each period shown under Column 5.

Column 6; Possible Daily Room Utilization. If the school is organized on a six period day, it is possible to use the room all six periods. If it is an eight period day, then ^{the} room is available for use eight periods.

Column 7; Actual Daily Room Utilization. The figures entered in this column show the actual number of periods

per day the room is used. If there are six periods per day and the room is used only three periods, then ^{the} figure 3 would be entered. Room 16 is an example.

Column 8; Percent Daily Room Utilization. This figure is obtained by dividing the possible number of periods the room could be used per day into the actual number of periods it is actually used per day (Column 7 divided by Column 6).

Column 9; Possible Daily Seat Utilization. This is an important double column because it shows the total number of students which could be housed in a classroom at capacity during a school day. The left number shows the total students which could be housed if the room was used five of the six periods, a very reasonable utilization; and the right number shows the total students which could be housed if the room (seats) housed a capacity class each period of the school day. (5 x Column 4 and 6 x Column 4)

Column 10; Actual Daily Seat Utilization. The figures in this column are the actual number of students which use a given room each day. For example, if a classroom housed 25 pupils per period for four periods, the actual daily utilization would be 100 and entered into Column 10.

Column 11; Percent of Daily Seat Utilization. As in column 9, these important figures are calculated by dividing the possible number of students which could be accommodated into the actual number of students which are using the room per day. The left number is based on the reasonable 83.3 percent utilization (see left number in Column 9); and the

right number is based on 100 percent utilization of the room (see right number in Column 9). The calculation is made by dividing Column 9 for 5 periods and Column 9 for 6 periods into Column 10.

INTERPRETING UTILIZATION TABLES

The interpretation of utilization tables begins with an examination of Columns 4 and 5. This shows the relationship of the number of students occupying the room each period (see Column 5) to the capacity of the room (see Column 4). The principal can tell at a glance which room is housing classes too large or too small for the room or laboratory size. To facilitate review, it is a good idea to underline the class sizes which are too large for the room -- that is, classes which are larger than room capacity. In Room 10, the capacity is 25 and the first period class contains 27 students. The room is 8 percent crowded during this period of the day. Since the language room (16) is not occupied first period, perhaps it would be appropriate to hold the first period English class in Room 16, unless it houses the older style language laboratory equipment.

Column 8 shows the percentage of time a given room is being used. The ideal utilization figure for an average-size high school operating on a six period day is 83.3 percent. The Table shows therefore that of the six rooms, one is crowded, two are underutilized and two are utilized at the ideal level of 83.3 percent.

Columns 9, 10, and 11 all contain important data for assessing pupil station utilization. If a 25-student-capacity classroom operates at capacity for 5 of 6 periods it could house 5x25 or 125 students per day. This utilization could go up to 6x25 or 150 students if the room was utilized all 6 periods. By comparing these figures to the actual

use figures (Column 10) and dividing the two to obtain the figures under Column 11, the principal can quickly determine how well the seats within the rooms are being utilized. If classes can be sized to match room sizes, then the utilization figures will be near 100 percent which of course is ideal for pupil station utilization. The caution is to avoid exceeding 100 percent, because a utilization figure in excess of 100 percent indicates crowding which can retard effective instruction.

CALCULATING ADEQUACY OF ROOM SIZE

An additional use which school executives make of the utilization table is to develop an adequacy of room size table. This is particularly useful when contemplating a referendum because voters can see at a glance the extent to which the school rooms meet recognized space (area) standards. The technique is illustrated below in Table 3.

TABLE 3. ADEQUACY OF ROOM SIZE AT CENTRAL HIGH SCHOOL.
(Showing six typical classrooms for illustration purposes)

Room Number	Room Use	Actual Area Sq. Ft.	Rec. Area. Sq. Ft.	Difference	
				Surplus Sq. Ft.	Deficit Sq. Ft.
10	English	750	800	-	50
12	Drafting	700	1000	-	300
14	Soc. Stud.	750	800	-	50
16	Language	800	800	-	--
18	Science	900	1200	-	300

The table shows (see last two columns) that of the six rooms included, only one meets the size standard and of the four undersized rooms, the two specialized rooms -- drafting and science -- are considerably undersized.

SUMMARY

Utilization tables appear complicated of first glance; however,

upon study they are quite easy to develop and involve only a few calculations requiring only a basic knowledge of simple percentage.

When completed, the table provides the school executive with an important management tool which can be used effectively to:

1. Schedule classes into appropriately sized rooms.
2. Locate unused rooms to house periodically ad hoc student seminar or enrichment groups.
3. Help ascertain the advisability of removing a partition between two poorly utilized rooms to create one larger room or even three or four small committee, conference, resource, or seminar rooms.
4. To provide data relative to room sizes and use for strengthening justifications for facility modernization or replacement.

While some school executives appreciate the need for the types of data in utilization tables, all should realize that developing such data for their schools is good managerial practice.

END